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[Title of the invention]

Apparatus and method for producing logo data, recording medium storing the method, and software product containing program for implementing the method

[Detailed description of the invention]
[0001]

[Technical field of the invention]

The present invention relates to a method for producing logo data to be stored in a printer that prints internally registered logo data according to a specific print command, a recording medium for storing a computer program that achieves the method, to a computer program product comprising executable commands of the recording method, and an apparatus for producing the logo data. A logo generally refers to a mark of a special design showing a store or company name, for example, and printed on a sales receipt by a POS terminal, but is also used in the present specification as a concept including in addition to such marks advertising information, coupons, and announcement information as further described below.
[0002]

[Prior art]

In addition to printing product transaction information to sales receipts, POS (point-of-sale) terminals also print logos containing a store or company name, for example, on the receipt. Logos printed by POS terminals are often special decorative fonts or have a special graphic design, and most logos contain image data.
[0003]

Such image data objects are typically large, and much time is required for printing when the logo data is sent to the printer each time a receipt is printed. It is also necessary to complete the checkout process, that is, register the purchased products and print the receipt to complete the transaction, quickly with a POS terminal apparatus, and fast printing is therefore necessary. Frequently printed logo data is therefore commonly stored in non-volatile memory or storage in the POS terminal apparatus, which then reads the logo data from non-volatile memory when a specific print command is received to print the logo. By thus registering the logo data in the printer, it is not necessary to send the logo data (mainly image information) from the host, thereby not only

reducing the load on the host but greatly improving the printing speed because no transmission time is consumed. The present invention relates to registering these various types of logo data in a printer.

[0004]

The latest full-color printers are capable of printing more than 16 million colors, and can print in colors that are very near natural color. Full-color logo printing is therefore also possible, but in addition to requiring a complicated image processing operation, printing in near-natural colors requires storing print pattern data in colors such as cyan (C), magenta (M), yellow (Y), and black (K) images, and requires printing this dot data. Compared with monochrome printing, full-color printing is therefore generally slower and requires a more complex print mechanism because of processing the image data for printing, receiving data by the printer, and the required printing process time.

[0005]

With a POS terminal apparatus, on the other hand, high speed, consistent print quality, quiet operation, and economy are required because of the need to print receipts during the checkout process, and full-color printing is therefore not necessarily desirable. Full-color printing is thus not necessarily needed, there is a need to reduce natural color images to a specific number of colors for printing according to various applications, and products meeting this need will be provided.

[0006]

The primary purpose of a POS printer is printing detailed information about sales transactions, including the purchased products and price information, to a sales receipt and journal paper. Color printing has therefore been a relatively low priority need with POS printers, and the latent need for color printing has not been particularly recognized.

[0007]

Sales receipts issued from POS printers are, however, both a memo and receipt informing the customer what products were purchased and purchase price, and other information. Sales receipts are therefore handed directly to the customer after the purchased products have been registered and the sales transaction is completed. Many customers also read the receipt to confirm the product and price information and check for errors. Many customers also refer to the receipt to record their purchases in a home

budget ledger after returning home while confirming the content. Receipts are thus individually handed directly to the customer, receipts are considered important by the customer because they record important information, and are a medium that is fundamentally different from common flyers and advertisements.

[0008]

Customers look at the content of a received receipt and confirm whether there are any mistakes in the purchased products and payment information. Therefore, by printing information of interest to the customer on the receipt, the information can be reliably conveyed to the customer. In this case, however, it is also desirable to differentiate this message information as much as possible. Products can therefore be promoted and announcements given to customers via the receipt by printing photographs or pictures for an advertisement or text or announcement information (referred to below as "promotional images") in color on receipts in the same way as conventional logo printing. Because receipts are handed directly and individually to each customer, their ability to get the attention of and appeal to the customer is noticeably greater than normal print advertisements and flyers. Color image information in particular is an effective means of getting the customer's attention and attracts attention every time the customer checks the receipt. Printing this advertising information on receipts is therefore particularly effective as an advertising and sales promotion tool.

[0009]

POS printers are typically not full-color printers because of reasons relating to print speed and economy as noted above, and can only print using a few specific colors (such as red and black, for example). Even though the number of printable colors may be limited, POS systems that can print color images can be used as a sales promotion tool rather than simply a terminal for registering sales transactions, and the use of POS systems equipped with color printers is therefore expected to increase further in the sales and distribution industry.

[0010]

[Problem to be solved by the invention]

Once it is possible to print color logos and logo printing is used for more applications, it will also be desirable to be able to change logo size, assign different colors, and adjust the resolution according to the promotional information and images to

be printed. As the types of logo data increase, recycling logo data currently or previously used for printing notifications and announcements, coupons, advertisements, and other applications by slightly changing the logo data content will also become common.

[0011]

With conventional POS terminals, however, the registered logo data is created using a graphics program, for example, and a separate logo registration program is then used to store the logo data in the printer. Logo production software for reducing a full-color image to the printable colors of the printer and then storing the logo data in a printer has also been available, but when color reducing the full-color data and assigning the colors to colors printable by the printer, color assignment has been fixed to predetermined colors. The problem is the desired logo cannot be freely produced using the desired color combinations and color reduction method. Producing a logo for a particular printing purpose is therefore difficult, and color POS printers cannot be effectively used.

[0012]

The present invention is directed to solving the problems described above, and an object of this invention is to provide a logo producing method that makes it simple to create or change a logo, a recording medium recording commands executed to achieve this method, and a logo producing apparatus.

[0013]

A further object of the invention is to provide a logo producing method whereby logo color assignments, size, color reduction method, and other settings can be changed while viewing the image that will actually be printed as the logo is produced, a recording medium recording commands executed to achieve this method, and a logo producing apparatus.

[0014]

A yet further object of the invention is to provide a logo producing method whereby a new logo can be created using previously registered logo data, a recording medium recording commands executed to achieve this method, and a logo producing apparatus.

[0015]

It should be noted that the present invention shall not be limited to POS printers, and can be used in a variety of applications for storing logo data in a printer so that the logo data can be used to repeatedly print specific image information

from the printer. In addition to POS terminals, such printers are also used in bank ATM machines, parking lot ticket machines, and machines for printing numbers for customers waiting for service in a bank, for example. It will also be noted that a logo generally means a mark containing a store or company name with graphic elements and/or special decorative letters used in a POS terminal apparatus. As used herein, however, logo data or logo information include in addition to this conventional meaning advertising information, announcements or notices, coupons, and other image information registered in a printer for repeatedly printing by the POS terminal apparatus as described above. Furthermore, a logo as used herein can contain text data as well as image data, and can be monochrome or color.

[0016]

[Means for solving the problem]

The present invention solves the above problems as described below according to the principle of the invention.

[0017]

The present invention solves the above problems by producing the source data that is the basis for a logo that is ultimately registered by combining image data and text data so that color reduction methods can be selected, plural source data colors can be assigned to desirable printable colors, and logo data size can be specified.

A method of producing logo data registered in a printer according to a first aspect of the present invention is characterized by having (a) a step for producing source data including image data and/or text data of at least two colors; (b) a parameter data input step for enabling inputting various processing parameters, including at least a color specification for assigning a color used in the source data to a specific desired color; (c) a data processing step for conversion processing the source data according to the input parameters; and (d) a step for storing the processed data processed in the (c) data processing step as logo data.

[0018]

This enables assignment to desired colors when reducing source data containing multiple colors to a smaller number of colors. While image boundaries can become hard to discern because the same color is assigned when fixed, predetermined color assignments are used, the method of the invention enables individual color

assignments so that the boundaries are clear. It is also possible to freely specify the best color assignment for a particular logo printing objective. This is also not limited to cases in which the source data contains more colors than the printer can print, and which colors are used can be specified as desired even when the source data has the same or smaller number of colors than the printer can print.

[0019]

In another aspect of the present invention the parameter data input step preferably has at least: a source data display step for displaying the source data as an image; and a color data input step enabling input for freely assigning the number of colors in the source data to colors that can be printed by the printer.

[0020]

Even better color assignments can be made in this case because the color assignments, for example, can be made while viewing an image of the source data.

[0021]

In a further aspect of the invention the source data display step includes a step for generating first process data by a color reduction process reducing the number of colors in the source data to a specific number or less when the number of colors used in the source data is greater than or equal to the specific number, and a step for displaying the first process data as an image; and the color data input step enables color assignment input for assigning each color in the first process data to a color printable by the printer. With this aspect of the invention the source data is displayed after reducing source data colors to a specific number of colors if the source data contains many colors, thus making color assignment easier. More specifically, color assignment is extremely difficult with a full color image, but color assignment is relatively simple if it is based on an image first reduced to only eight colors, for example.

[0022]

In a yet further aspect of the invention the colors assignable in the color data input step are the multiple colors printable by the printer and the color of the printing paper, and the multiple halftones that can be created by combining these colors. For example, if each pixel unit consists of plural adjacent dots, each dot can be printed using a printable color. It is therefore possible for the color data input step to assign colors (referred

to herein as halftones) that can be expressed with combinations of each dot (color) in a pixel unit. More specifically, if the colors assignable in the color data input step are a first color and a second color printable in dot units by the printer, and a third non-printing color expressed by the color of the printing paper, the colors that can be produced using a combination of the first color, second color, and third color that is the color of the printing paper can be assigned as halftones.

[0023]

In yet another aspect of the invention when the colors printable by the printer are black and a specific chromatic color, the color data input step can assign black or a halftone of black and the color of the printing paper to achromatic parts of the source data or first process data, and assign chromatic parts of the source data or first process data to the specific chromatic color printable by the printer.

[0024]

In another aspect of the invention the parameter data input step further enables inputting specific data according to the functions of the printer for registering the logo data, and the data processing step is able to adjustably process the source data according to the input printer-specific data.

[0025]

In this case the printer-specific data input in the parameter data input step includes paper width data specifying a printing paper width and printing resolution data; and the data processing step applies data processing to calculate a printable image size based on the input printing paper width and printing resolution, and adjust the source data image size.

[0026]

In a yet further aspect of a logo data producing method according to the present invention the step for producing source data includes a step for inputting image data and/or text data; a step for editing the input data; and a step for storing the edited data.

[0027]

In a yet further aspect of the present invention the step for inputting data in this source data capturing step has a step for capturing at least one image data object; and the editing step has a step for combining a positional orientation and size change of

the captured image data. Overlapping and combining images is thus possible. It is also possible to add text data.

[0028]

In another aspect of the invention source data including multiple image and/or text data objects can be produced as image data produced by overlapping multiple image data or text data objects so that they can be independently processed. As a result, to produce logo data, multiple image data or text data objects in the source data can be separately color reduction processed and colors can be assigned.

[0029]

Moreover, in a logo data producing method according to another aspect of the invention the source data display step includes reducing and displaying the source image.

[0030]

Furthermore, a logo data producing method according to another aspect of the invention includes a step for displaying an image after processing the source data according to the set parameters. It is also possible in this case to reduce and display the image after processing.

[0031]

A logo data producing apparatus according to another aspect of the invention has a source data capturing means for capturing image data and/or text data of at least two colors; a source data display means for displaying the source data; a parameter data input means for enabling inputting parameters for processing source data, including at least color selection input for assigning a color in the source data to a specific color; a data adjustment processing means for processing the source data according to the input parameters; and an output means for outputting the processed source data processed by the data adjustment processing means as logo data.

[0032]

The data adjustment processing means is characterized by further including a means for reducing the colors in the source data to a specific number of colors or less when the captured source data has a specific number of colors or more, and the source data display means displays the source data after color reduction.

[0033]

Furthermore, in another aspect of the invention the data adjustment processing means further has means for setting halftones combining colors usable by the printer; and the parameter data

input means can assign source data colors to colors usable by the printer and halftones thereof. In this case the data adjustment processing means produces halftones with dithering or dot gradation.
[0034]

Furthermore, in another aspect of the invention the data adjustment processing means assigns chromatic parts of the source data to the specific chromatic color printable by the printer when the colors printable by the printer are black and a specific chromatic color.

Another aspect of the invention has a logo image display means for displaying the source data processed by the data adjustment processing means.
[0035]

In a logo data producing apparatus according to another aspect of the invention the parameter data input means has a parameter definition means and enables parameter data input until the parameters are confirmed by the parameter definition means; the data adjustment processing means processes data according to the input parameters until the parameters are saved; and the logo image display means continually updates the logo image display according to the processed data from the data adjustment processing means. As a result, the processing parameters can be changed any number of times while confirming the processed image after parameter data input to produce the best logo data.
[0036]

[Description of preferred embodiments]

A preferred embodiment of the present invention is described below. It will be noted that the embodiment described below is by way of example only, and shall not limit the scope of the present invention. Therefore, one skilled in the art will be able to use embodiments replacing some or all of these elements with an equivalent element, and these embodiments are also included in the scope of the present invention. In the following description based on this assumption the invention is described using a POS printer, the type of printer that is most frequently used for logo printing.
[0037]

(Overview of procedure for storing a logo to a printer)

A logo registration procedure according to the present invention is described next with reference to Fig. 2. Fig. 2 shows an outline of a process according to the present invention from logo production to registering the logo in a printer.

[0038]

Before the logo data can be registered, the logo to be registered must first be defined. This can be accomplished by producing a new logo to be stored, or by using an existing image file as is. A logo editing tool is used when producing a new logo according to the logo printing objective. Logo data is often produced for a particular printing purpose, such as printing coupons, printing a company or store logo, or a product advertisement. A logo editing tool is used in cases such as these. Logo production using a logo editing tool is a task involving producing text information, bringing in image information such as pictures or photographs, and then appropriately combining the text and image information to produce the desired logo. The logo editing tool will be described in further detail below.

[0039]

Using existing image data is described first. In this case a digital camera, scanner, or other such imaging tool 81 generates an image file 82 from a picture, photograph 80, or other image that is then used as the source logo data. It is therefore not necessary to use the logo editing tool 2 when using such an existing image file 82. Data produced in this way as the basis for logo registration is referred to herein as source data 3.

[0040]

The logo data producing apparatus 4 then adjusts the colors and size of the source logo according to the printable colors, print resolution, and width of paper used with the target printer. After adjusting the colors (by color reduction, for example), size, and resolution, the resulting logo data (variously referred to herein as the logo, logo data, logo information, or print image data) is the data to be stored to the printer.

[0041]

If the printer is connected, the logo data is sent as is to the printer and stored to non-volatile storage in the printer. If the printer is not connected to the logo production tool, a logo data registration file for storing the logo data is created. The logo data registration file is an image file containing logo data and a command data set for storing the logo data. By forcing the host device to read the logo data registration file, logo registration is possible without installing a special registration program in the host device. The logo data registration file is further described in detail below.

[0042]

Once a logo is stored to logo memory in the printer, the logo can be printed by simply issuing a print logo command.

[0043]

(Logo editing tool)

The logo editing tool is described next below.

[0044]

A logo must be defined before the logo data can be stored in the printer. The logo editing tool is used to create a new logo according to the purpose of the logo to be printed. To create a new logo, an existing picture, photograph, or other image 80 is gotten using the logo editing tool 2, text data is written and combined therewith or plural images are combined to produce source data 3 that is the basis for an effective logo best suited to the advertising, announcement, or other objective. A logo is produced to match a particular printing purpose, such as printing coupons, printing a company or store logo, or product advertisement.

[0045]

Producing source data using the logo editing tool involves creating the text information, bringing in pictures, photographs, and other image information, and then appropriately combining the text and image information to create the data that will be the basis for producing the desired logo. The logo editing tool can also be configured so that the source data can be produced using only text data without incorporating any images, or by drawing graphic elements.

[0046]

The logo editing tool is described in further detail next with reference to Fig. 3. Fig. 3 is a function block diagram showing a first embodiment of a logo editing tool 2 according to the present invention.

[0047]

The logo editing tool 2 is used to create the basic configuration of an effective logo that is best suited to the printing purpose, such as an advertisement or notice. The logo editing tool 2 can create the source data that is the basis for a logo incorporating image data and text data, send the resulting source data as source data to the logo data producing apparatus 4 (Fig. 2), and save the source data as a source data file 3.

[0048]

The logo editing tool 2 includes an image data reading means 31, storage means 32, image data processing means 33, text data editing means 34, graphic drawing means 35, synthesizing means 36, source data output means 37. The image data reading means 31 reads and stores the image data or text data. The read image data can be graphic data stored as image files to a magnetic disk, CD-ROM, or other storage medium that is read and stored to storage means 32, images captured with a digital camera, or images captured with a scanner.

[0049]

The graphic data could include photographic images, animated graphics, geometric patterns, decorative letters, and various types of graphics. Multiple graphics or images can be stored separately to the storage means 32. The image data reading means 31 is preferably compatible with various image file formats and software programs so that as many different types of image files as possible can be read.

[0050]

The image data processing means 33 processes the image data stored to storage means 32 to adjust the image size and other parameters as necessary. In addition to image data, text data can be created and edited by the text data editing means 34. The color of the text can also be specified. By making the text data editable, textual information appropriate to the advertisement or notice can be included when the logo is edited. Furthermore, by providing a graphic drawing means 35, the logo editing tool 2 can also be configured so that graphic elements can be composed inside the logo editing tool 2.

[0051]

The captured image information, image-processed image information, and graphic and/or text elements created in the logo editing tool 2 are then merged by the synthesizing means 36 to create the desired logo. The synthesizing means 36 combines multiple image data, graphic, or text data objects to produce the desired source data. Elements in the combination of image and text objects in the logo include, for example, the selection of images and text, and the size and position of the images and text relative to the overall logo. The source data synthesized by the synthesizing means 36 is synthesized as a combination of independent image or text objects, and output by the source data output means 37.

[0052]

The source data output means 37 can send the source data directly to the logo data producing apparatus, or output the source data as a source logo data file. The synthesizing means 36 merges the source data so that the images and other elements combined in the source data can later be image processed and manipulated as separate images, for example. When the source data is output as a file, it is preferably output as a metafile, that is, a file in which the elements therein can be independently manipulated.

[0053]

In this example the incorporated images, for example, are not color processed by color reduction, for example, by the editing tool 2, but when the photograph or other image 80 is a full color image, a configuration whereby the colors are reduced to a specific number of colors by the logo editing tool 2 and then stored as logo source data is also possible.

[0054]

(Logo data producing apparatus)

The source data 3 produced with the logo editing tool 2 is then changed by the logo data producing apparatus 4 to the final logo data format enabling the data to be stored to a specific printer.

[0055]

It should be noted that the source data obtained by the logo data producing apparatus 4 is not limited to the source data 3 output from the logo editing tool and includes existing image files 82 created by image processing software. Both data 3 and 82 are therefore referred to herein as source data.

[0056]

As described above, color POS printers are primarily limited to printing two or three colors. If the source data image is a full-color image or graphic data containing many different types of color (brightness, color, and hue), the colors of the source image must be reduced to the colors that can actually be printed by the POS printer. Furthermore, even though the printer can only use a few colors, it is still possible to print subtle shades instead of just two simple colors. If, for example, the printer can print the two colors black and red, shades of black and red can be expressed using dithering, for example, if each pixel unit consists of multiple dots. Extremely subtle, detailed, and complex color expressions are also possible using a combination of red, black,

and white (the color of the paper). Even more complex, subtle printing is possible if three or more colors can be used. It is therefore necessary to define what color or shade should be used for what color in the source data (referred to herein as assigning colors).

[0057]

It is also necessary to adjust the size of the logo to be printed to the paper that will be used for printing because different printers use different widths of printing paper (receipts). Furthermore, the size of the logo must be adjusted according to the printer resolution because the size of the printed logo will also vary according to the printing resolution of the printer.

[0058]

The logo data producing apparatus 4 is an apparatus for completing the logo in a form that can be printed by the target printer by, for example, adjusting the final image of the desired logo or adjusting the image by defining the width of the paper used by the target printer to which the logo data will be stored, specifying the color assignments according to the printable colors, and specifying the vertical and horizontal print resolutions. The logo data producing apparatus 4 can also set the connection port, communication speed, parity check, flow control, and other parameters for communicating with the target printer.

[0059]

The logo data producing apparatus 4 reads an existing image file 82 or source data file 3 produced by the logo editing tool, conversion processes (image adjustment processes) the image according to specific conditions (specifications) of the target printer that will store the logo, and thus creates a logo for registering a logo in the non-volatile storage unit of the target printer (storing a logo to a printer is referred to as registering the logo in the printer in this specification). The resulting logo data can also be output as a logo registration file in a specific format.

[0060]

(First embodiment of a logo data producing apparatus)

A first embodiment of a logo data producing apparatus 4 according to the present invention is described next with reference to Fig. 1. Fig. 1 is a function block diagram of a logo data

producing apparatus according to this first embodiment of the invention.

[0061]

A logo data producing apparatus 4 according to this first embodiment has a source data capturing means 10, source data image display means 11, parameter data input means 12, data adjustment processing means 13, logo data image display means 15, logo data output means 16, and a main control means 14 for controlling these.

[0062]

The source data capturing means 10 gets normal image file 82 or source data 3 from the logo editing tool 2 (Fig. 2) as controlled by the main control means 14. The source data is then stored in the source data capturing means 10. The source data capturing means 10 can read different types of files or capture images using a file reading means or image capturing means. What types of files can be made readable can be set as desired. More specifically, a reading means able to read from a magnetic storage reading device (such as a floppy disk drive or hard disk drive), CD-ROM drive, CD-RW drive, DVD drive, scanner, or other type of reading device could be used.

[0063]

Once the source data is stored, the main control means 14 controls the parameter data input means 12 so that various image processing parameters for adjusting the image can be input. This enables inputting the printer name, colors that can be printed by the printer, resolution, gradations, and other parameters. The main control means 14 also controls the source data image display means 11 at the same time to display an image of the source data on screen at the same time.

[0064]

This enables inputting the necessary parameters while viewing an image of the source data and examining the specific results of using a particular color reduction method and assigning colors in the source image to particular printable colors.

[0065]

After the parameters are set, the input settings are sent to the data adjustment processing means 13, and the colors, resolution, size, and other aspects of the source data are processed according to the input settings. In this case, if the printing resolution of the printer drops, the printed image will be larger. Therefore, if it is desirable to keep the size of the print image the same size

as the source data image, or if the print image will be wider than the paper width because the printer resolution is low, a process for reducing the size of the print image is needed. That is, the size of the logo registered in the printer must be determined by adjusting the size of the source data according to both the width of the printing paper and the printer resolution. The adjustment processed source data is then presented by the logo data image display means 15 as the image after these changes are made. What type of print image will be produced from the set parameters can therefore be confirmed from the displayed image. The image adjustment parameters can also be changed while looking at the processed image. If there are no parameter changes and the settings are confirmed, the logo data after data processing is transferred to the logo data output means 16 based on control by the main control means 14.

[0066]

As controlled by the main control means 14, the logo data output means 16 then stores the logo data, outputs it as a logo data registration file in a specific format enabling storage to the printer, or registers the logo data in the printer. The logo data output means 16 can also output the logo data adjusted to the target printer specifications as described above as a monochrome or color bitmap image file. Files thus produced can be stored in the logo registration tool or to an external (not shown in the figures) recording means (such as a magnetic recording medium).

[0067]

Note that specifying the color assignments and settings for the image processing method are described more specifically below using flow charts and sample display screens.

[0068]

(Second embodiment of a logo data producing apparatus)

A second embodiment of the present invention is described next with reference to Fig. 4. Fig. 4 is a function block diagram of a logo data producing apparatus 4-2 according to a second embodiment of the present invention.

[0069]

This embodiment differs from the first embodiment in providing an image reduction processing means 17 and displaying the source data and logo data after applying a reduction process. This enables even more efficient image processing because the source data and an

image of the logo after changes are made can be simultaneously displayed on the same screen.

[0070]

(Third embodiment of a logo data producing apparatus)

A third embodiment of the present invention is described using Fig. 5. Fig. 5 is a function block diagram of a logo data producing apparatus 4-3 according to a third embodiment of the invention.

[0071]

This embodiment differs from the second embodiment in that to display a reduced image of the logo data the source data is first sent to the image reduction means 17 and reduced, and the color data is then reduced or otherwise processed by the data adjustment processing means. By configuring to first reduce the image and then apply color reduction processing, the grid shaped noise and striping patterns that appear when the image is reduced after color reduction can be prevented, and a preview even closer to the actual printed image can be displayed.

[0072]

(Producing a logo data registration file using the logo data output means)

As described above, the logo data output means 16 shown in Fig. 1, Fig. 4, and Fig. 5 can register a logo directly to a printer and can create a bitmap logo data file, and it can also create a logo registration file 5 (Fig. 2) with logo registration execution command. This logo registration file 5 is an image file with commands combining logo data and a command data set needed to store the logo data. Logo registration direct from the logo registration file 5 is possible without installing a special registration program by causing the host device of the POS terminal, for example, to read this logo data registration file 5. The host completes logo registration by sending the storage command in the read logo data registration file 5 to the printer.

[0073]

Fig. 6 is a function block diagram of the logo registration file output means 18 in a preferred embodiment of the logo data output means 16 for generating a logo registration file. Note that Fig. 6 shows only the major components, and those parts not particularly important to logo file generation are omitted.

[0074]

The logo registration file output means 18 has a command data set generating means 19, logo registration file generating means 20,

and communication interface 21. The logo registration file output means 18 receives and stores logo data from the data adjustment processing means 13. The command data set generating means 19 creates a set of commands for registering a logo produced by data adjustment processing means 13 in the printer. The command data set generating means 19 has a registration command data set generating means 22 and transmission command data set generating means 23. The registration command data set contains executable commands sent to the printer for registering the logo in the target printer.

[0075]

The transmission command data set generating means 23 has a parameter input command data set generating means 24 for producing an executable command set enabling receiving input of parameters such as the communication port, a port detection command set generating means 25 for producing an executable command set for detecting the communication port to which the target printer is connected, and a transmission command set generating means 26 for producing a transmission command data set for sending the registration command data set and logo data to the target printer.

[0076]

The logo registration file generating means 20 (called the file generating means 20 below) combines the logo data (print image data), registration command data set, and transmission command set to produce logo registration file 5 (Fig. 2). This logo data registration file is preferably a single file, but can be combined by linking plural files. Whether the transmission command data set is generated, whether the parameter input command set is generated, and whether the port detection command set is generated can be specified with a control unit not shown in the figure.

[0077]

The logo registration file produced by the logo registration file generating means 20 can be connected to a communication line via communication interface 21 and sent to the host device of the POS terminal to which the target printer is connected. It can also be stored from the logo registration file generating means 20 to internal memory or non-volatile (NV) memory (not shown in the figure), or can be recorded through an input/output interface (not shown in the figure) to floppy disk, hard disk, memory card, or other external storage device (not shown in the figure). By then causing the POS terminal host to read the logo registration file recorded to floppy disk or other medium or the logo data

registration file sent via the communication link, the command data sets in the logo registration file can be read and logo registration to the printer is possible without installing a special registration program in the host.

[0078]

The logo editing tool 2 and logo data producing apparatus 4 are described as separate configurations above, but the logo editing tool 2 can be built in to the logo data producing apparatus 4, creating a logo data producing apparatus having an integral logo editing function.

[0079]

It will be obvious to one with ordinary skill in the related art that the logo editing tool and logo data producing apparatus described above can be achieved using a microprocessor (CPU), ROM and RAM connected via a bus to the CPU, and an operating system (OS) and other appropriate control programs stored to the ROM and RAM. The CPU, ROM, and RAM cooperate to function as the various function blocks according to the control programs stored in the ROM and RAM. The various parts of the logo editing tool 2 and logo data producing apparatus 4 are thus achieved by integrally linking various input devices, control programs, CPU, and storage devices.

[0080]

(Procedure of the logo editing process)

The logo editing process is described next with reference to Fig. 7 to Fig. 13. Fig. 7 is a flow chart of a preferred embodiment of the logo editing method according to the present invention for producing logo data, and Figs. 8 to 13 show examples of screens presented for inputting data in this logo editing process.

[0081]

A preferred embodiment is described first with reference to Fig. 7. The first step when the logo editing tool 2 starts is to confirm whether to read the image data that will be the basis for producing source data (S101). Image data is typically read from a file, and this could be a source data file 3 previously generated by the logo editing tool 2, or some other existing image file. If a file is to be read (S101 returns yes), the read file is selected and read, and then stored in logo editing tool 2 (S102). If reading a file is not necessary (S101 returns no), the procedure advances to step S103. Whether drawing or text input is necessary is then determined (S103). If it is (S103 returns yes), the input routine is run (S104). If not (S103 returns no), the procedure advances to

step S105. In step S105 the size of the read image data or text data is changed, and multiple images or text objects are combined according to user input. If input is not completed (S106 returns no), steps S104 to S106 repeat until input for drawing, text, and merging operations is all completed. When input is completed (S106 returns yes), the result is stored internally as source data or output as a source data file (S107).

[0082]

The logo editing process is further described below using examples of the logo editing process display screens shown in Fig. 8 to Fig. 13. Note that the process described below using these display screens is substantially the same in content and result as the process described with reference to the flow chart in Fig. 5, but not does not correspond 1:1 to the Fig. 7 flow chart.

When the logo editing tool 2 or logo data producing apparatus 4 starts up, a main screen 100 such as shown in Fig. 8 and used for both logo generation and editing is presented in an embodiment of the invention. When the new button 110 in the main screen 100 in Fig. 8 is clicked, the main editing screen 120 of the logo editing tool is presented as shown in Fig. 9. This main editing screen 120 includes file 121, edit 122, display 123, and tools 124 buttons in the top toolbar, and a logo editing area 127 in the middle.

[0083]

Clicking the file button 121 of the main editing screen 120 presents, for example, a pull-down menu (not shown in the figure) with buttons such as "new," "open," "close," "save," "save as," "logo size," and "quit." The "new" button is used to produce new logo data, and when it is selected a dialog box 130 such as shown in Fig. 10 for specifying the size of the logo (source data) is presented. The dialog box 130 is used to define the size of the logo for which new source data is to be created.

[0084]

The "open" button (not shown in the figure) is used to open an existing file, and selecting "open" presents a file selection dialog box (not shown in the figure) from which a source data file previously created with the logo editing tool, for example, can be selected. The "close" button (not shown in the figure) closes the source data file being edited; if a change was made to the source data file, a prompt asking whether to save the changes is presented. The "save" button (not shown in the figure) is selected to save the source data file being edited by overwriting the previous file; if

"save" is selected when creating a new source data file, a dialog box asking the user to specify a name is presented. The "save as" button (not shown in the figure) is used to specify a name and save the source data file being edited. The "logo size" button (also not shown in the figure) is for changing the logo size of the source data being edited, and when this button is selected buttons the same as shown in Fig. 10 are presented and the logo size of the source data can be changed. Processing by the logo editing tool is terminated with the "quit" button. If there is a file with unsaved changes, a message prompting the user to save the changes is presented.

[0085]

When the "edit" button 122 is selected from the main editing screen 120 in Fig. 7, a dialog box with selections such as "undo" (for reversing the previous operation), "cut," "copy," "paste," and "select all" (none of which are shown in the figure) is presented. These functions are the same as in commonly available word processors. Selecting the "paste" button (not shown in the figure) pastes an object on the clipboard into the logo (source data) being edited. The types of objects that can be pasted include text, dib format, bmp format, JPEG format, and other common drawing or graphic object types, source data files created with the logo editing tool 2, logo data files created with the logo data producing apparatus 4, and any other type of graphic object that can be recognized by the editing tool. If the object on the clipboard is a bitmap, it is treated as an image object. "Select all" (not shown in the figure) selects all objects in the source data being edited. Cut, copy, move, delete, and other operations can be applied to the selected objects.

[0086]

Selecting "display" 123 from the main editing screen 120 in Fig. 7 presents a dialog box containing items such as "zoom in" for enlarging the display, "zoom out" for reducing the display, "show grid," "align to grid" for selecting whether to automatically place objects on the grid, and "define grid" for setting the X-Y grid units and alignment (none of which are shown in the figure).

[0087]

When "tools" 124 is selected from the main editing screen 120 in Fig. 9, a dialog box with such items as "insert," "text properties," "image properties," "input coordinates," "bring to front," and "send to back" is presented (none of which are shown in

the figure). When "insert" is selected a submenu with "text" and "image" items is presented (not shown in the figure). Selecting "text" and clicking and dragging in the logo editing area 127 inserts a text object at the specified size and position. Selecting "image" and clicking and dragging in the logo editing area 127 inserts an image object of the specified size and position. When an image object is inserted, an image properties dialog box is presented for selecting the image file to insert.

[0088]

If "text properties" (not shown in the figure) is selected a text object properties dialog box 140 such as shown in Fig. 11 is presented. Selection from a list of WIFE fonts or TrueType fonts, for example, is possible with the font name selection box 141. Selection from a list of styles supported by the selected font is possible from the style selection box 142. Selection from a list of sizes supported by the selected font is possible from a size selection box. Other text attributes, color, and text object rotation can also be selected.

[0089]

When "image properties" (not shown in the figure) is selected an image properties dialog box 150 such as shown in Fig. 12 is selected. When the file name of the image file to read is input to the file name box 151, the image file is read and displayed in the preview area 152. A reference button (not shown in the figure) can also be provided to reference and select a file. Selecting the "fit to paper width" checkbox 153 changes the image size of the image data to the width of the paper. This function automatically adjusts the image size to the width of the paper when the paper width used by the printer has been defined. The image object can be set to "opaque" or "transparent" from the drawing mode 154. "Opaque" causes the object to print in front regardless of any background objects. "Transparent" displays the result of a logical OR between the background and selected image.

[0090]

When "input coordinates" (not shown in the figure) is selected a dialog box 160 such as shown in Fig. 13 is presented. This dialog box enables specifying the top left coordinates (X, Y) of the selected object.

[0091]

The "bring to front" button (not shown in the figure) displays the selected object in front of all other objects. Selecting the

"send to back" button (not shown in the figure) displays the selected object in the background behind all other objects.

[0092]

In addition to the above other window menu selections such as stack, panes, arrange icons, and version information could also be provided.

[0093]

(Logo data production procedure)

A logo data production procedure is described next using Fig. 14. Fig. 14 is a flow chart showing a logo data producing method according to an embodiment of the invention. The first step is to read and store for processing a source data object from a source data file 3 prepared with the logo editing tool 2 or existing image file 82 as described above (S201). An image of the stored source data is then displayed on screen (S202). Input of parameter settings is then accepted (S203). By thus displaying an image of the source data, the user can set the parameters for the next processes, that is, color assignment and color reduction method, while referring to the colors, pattern, and overall impression of the source data image. Next, the source data is image processed according to the input parameter settings (S204), and the image after processing is displayed on screen (S205). Because the user can thus see an image after image processing according to the input settings, corrections can be made to achieve the best logo at the time the logo data is produced.

Whether the input parameters have been defined is then confirmed (S206), and if input is not defined (S206 returns no) steps S203 to S206 repeat. Therefore, parameter input repeats while confirming the image after image processing, and parameter input can be repeated until the user confirms the final image processing settings. When the input settings are confirmed (S206 returns yes), the logo data is output (S207). Logo data output is described below.

[0094]

A logo data production process is described next using an example of a display screen of the logo production process as shown in Fig. 8 and Fig. 15 to Fig. 19. Note that the process described below using these display screens is substantially the same in content and result as the process described with reference to the flow chart in Fig. 14, but not does not correspond 1:1 to the Fig. 14 flow chart.

[0095]

In a preferred embodiment of a logo data producing apparatus according to the present invention the main screen 100 shown in Fig. 8 is displayed first as with the logo editing tool 2. This main screen has a printer data input box 220 enabling setting model-specific data such as the paper width, printable colors, and print resolution of the target printer in which the logo is registered. A communication parameters input box 221 enables setting the port number, communication speed, and other communication settings. These printer parameters and communication parameters are preferably set automatically as much as possible by simply specifying the name of the printer model in the printer data input box 220. This is possible by internally storing model-specific data for each printer, and reading and automatically setting the corresponding model-specific data when the model name is input.

[0096]

The source data that will be the basis for the logo can be read from a desired file by inputting a file name to the source file input area 223. The reference button 224 can also be clicked to reference files in a pull-down menu, for example. First display area 225 is an area for displaying an image of the source data, and second display area 226 is an area for displaying an image of the source data after it is processed according to the input image processing parameters. The most common files are source data created by the logo editing tool 2, but providing the ability to read as many different file types as possible will make it possible to use image data stored in various file types as the source data.

[0097]

Reading the source image, parameter setting, and image processing are described next. Fig. 15 shows the logo production screen 210 after a file has been read and parameters have been set from the main screen 100 (Fig. 8). Fig. 15 shows an example in which the source data image and image after image processing are shown reduced, but a configuration not reducing the display is also possible.

[0098]

When the file name is input to the source file input area 223 of the main screen 100 (Fig. 8), the content of the specified file is read as the source data and stored to a particular address. The stored source data is then reduction processed and displayed as an image of the source data as shown in first display area 225 (Fig. 15) provided in the logo production screen 210.

[0099]

The name of the target printer for registration, paper width, usable colors, resolution, and other model-specific data of the target printer can be input from the printer data input box 220, and the port number, communication rate, bit length, and other model-specific data can be input from the communication parameter input box 221. In this case a configuration enabling model-specific data for a corresponding printer to be read from a model-specific data storage means (not shown in the figure) and automatically set when the printer name is input or specified is also possible. Furthermore, if the target printer is connected, it is possible to automatically read a model ID from the printer to set the corresponding model-specific data automatically. The color assignments, color reduction method, and other parameters can also be input using the properties input box 222.

[0100]

A data image image processed according to the model-specific data and defined properties is displayed in second display area 226. Until the model-specific data and properties are defined the data is processed using existing settings or preset values, and the processed image is then displayed in the second display area 226 of the logo production screen 210. If a two-color printer is used, for example, a preview of the print image (logo) using the colors that can be achieved with three colors, that is, the two printable colors and white (the non-printing color, the color of the paper), is displayed. If the print resolution of the printer is low, the image is also displayed at low resolution.

[0101]

It should be noted that while the processed image is displayed reduced in the second display area 226 in this screen, a full-size button 231 can be clicked to display the print image at the same size as the actual print image (not shown in the figure).

[0102]

Defining the image data and text data properties is described next with reference to Fig. 15 to Fig. 18. In the following screen description the property settings are described as settings for image processing source data 3 produced with the logo editing tool 2. As described above, the source data created with the logo editing tool 2 can contain multiple image data and/or text data objects. The first step is therefore selecting the object to process using the object selection box 227 in the properties input

box 222 in Fig. 15. If, for example, image 1 is selected, image 1 is processed according to the processing method defined with the halftone definition box 228 and gray scale control box 229, and an image of the logo containing the processed image 1 is displayed in second display area 226. By individually selecting all combined objects from the object selection box 227 in the properties input box 222, individual image or text objects can be selected and processed.

[0103]

The color reduction slider 237 in the halftone definition box 228 slides left to right to specify the color reduction method in varying stages from coarse to fine. For example, three levels from coarse to fine, that is, simple color reduction, dithering, and error diffusion, can be specified. A brightness slider 236 can also be moved sideways to set the image brightness on a sliding scale. It is possible, for example, to set the brightness in five levels.

[0104]

When the gray scale control box 229 is on, the image can be reduced to a monochrome gray scale image; when off, the source data is reduced to all printable colors (two in this example). When reduced to a gray scale image, the monochrome color can be specified from the input box 238, or selected from a pull-down menu, for example.

[0105]

Furthermore, if text object 2 is selected from the object selection box 227 of the properties input box 222, for example, the properties input box 222 (Fig. 15) becomes like text input screen 240 as shown in Fig. 18. The user can then enter the desired text to the text input box 241, and specify the color of the text in the text color box 242 using a pull-down menu, for example.

[0106]

An example of a screen enabling a variety of color assignments is described next with reference to Fig. 17. Fig. 17 (a) shows a screen whereby after the source data is reduced to eight colors those eight colors can be assigned to 15 colors, and (b) shows an example in which source data reduced to eight colors is assigned to three colors. Reduction to eight colors results from a preset color reduction method or selecting a color reduction method from the color reduction slider 237 of the halftone definition box 228 described above.

[0107]

Fig. 17 (a) shows an example in which there are two printable colors, the first color being black and the second color being red. In this screen the eight colors of black, blue, red, magenta, green, cyan, yellow, and white are assigned to one of 15 colors by setting the color assignment sliders 251 in the assignment area 250 to a position from 0 -> 1 -> 2 -> 0 -> 12. An image of the source data is displayed at the top, and the image after color assignment is displayed at the bottom, on the right side in Fig. 15.

[0108]

How fifteen tones are assigned with the color assignment sliders 251 in Fig. 17, how a printer with two printable colors can print fifteen colors, and how the color assignment slider 251 specifies fifteen colors, are described referring to Fig. 18.

[0109]

Using two colors of ink (three colors if white is the non-printing color) and assigning a color to each of the four dots in one pixel, each pixel being a 2 x 2 matrix of four dots, one pixel can express fifteen different colors. The relationship between these fifteen colors and the color assignment slider 251 shown in Fig. 15 is shown in Fig. 18. In Fig. 18 a black dot (•) denotes black, a circle (o) denotes red, and a blank denotes a white dot. The values (x,y,z) below each matrix show the number of (white, black, red) dots in each matrix (pixel). In other words, the shade of each unit pixel is determined by the ratio of color dots in the four dots constituting each pixel.

[0110]

Area a (0 -> 1) in Fig. 18 shows matrixes containing combinations of only white and black dots and shows the range of change (direction) from a matrix with four white dots (0) to a matrix with four black dots (1). Area b (1 -> 2) shows matrixes containing combinations of only black and red dots, and shows the range of change (direction) from four black dots to four red dots (2). Area c (2 -> 0) shows matrixes containing combinations of only red and white dots, and shows the range of change (direction) from four red dots to four white dots. Area d (0 -> 12) shows the matrixes containing combinations of white, red, and black dots, and shows the range of change (direction) from four white to four black dots.

[0111]

The relationship between the color assignment determined by the position of the slider 251 in Fig. 18 and areas a, b, and c

will be understood from the figures. That is, the pixel changes gradually from white to black as the slider 251 moves from 0 -> 1, from black gradually to red as the slider moves from 1 -> 2, from red gradually to white as the slider moves from 2 -> 0, and from white to a mixture of white, red, and black and gradually to black as the slider moves from 0 -> 12.

[0112]

A screen for assigning eight-color source data to three colors is described next with reference to Fig. 17 (b). In (b) black, blue, red, magenta, green, cyan, yellow, and white in source data reduced to eight colors are each assigned to white, a first color (black), or a second color (red). The source data and an image resulting from the color assignment are also both displayed on this screen.

[0113]

By thus enabling the user to freely assign colors expressible by the printer to data obtained by color reduction processing the source data image, color assignments can be easily changed even in cases in which important color boundaries are assigned to the same color with fixed color assignments and the image becomes difficult to discern, and an expressive print result (logo) can therefore be achieved.

[0114]

Furthermore, the impact and expressiveness of a logo can be increased even with printers having little color capability (such as a two color printer) by using dithering or dot gradation, for example, to increase the number of colors and enabling the user to desirably assign types of print colors.

[0115]

While the source data that can be selected for color processing as determined by the properties input box 222 is limited in the above description to source data files produced by the logo editing tool 2, it is also possible to enable selecting an existing image file using the object selection box 227 as the source data for color processing according to the desired settings in the same way.

[0116]

The logo production screen 210 shown in Fig. 15 has edit 230, print test 232, file output 233, printer registration 234, non-volatile printer memory management 235, and quit 246 buttons.

[0117]

The edit button 230 starts the logo editing tool, and is used to re-edit a file during logo data production. When editing with the logo editing tool is finished, the logo data producing apparatus reads the content of the file being used again (the content after editing), and produces a logo reflecting the edited content. The editing process activated with the edit button 230 can also be restricted to being usable only when the source data file during logo production is a file produced with the logo editing tool.

The print test button 232 is used to actually print the produced logo data on a connected target printer. The logo data is not registered in the printer at this time.

[0118]

The non-volatile memory management button 235 enables printing or deleting NV graphics (NV: non-volatile storage) already registered in the target printer. The non-volatile memory management button 235 displays a non-volatile memory management dialog box 260 such as shown in Fig. 19. The get key code list button 261 gets a list of already registered NV graphic key codes from the connected printer and displays them in the NV graphic key code list 262.

[0119]

The select all button 263 selects all key codes displayed in the NV graphic key code list 262. The selected key codes can be printed or deleted. Printing and deleting the selected key codes is selected using the print button 264 and delete button 265 at the bottom of the selection box 260. The cancel selection button 267 deselects the key codes selected in the key code list. The NV graphics corresponding to the listed key codes are stored in the logo data producing apparatus. The print button 264 reads and prints the graphic corresponding to the selected key code. The key code for the printed graphic can be printed in the header of the NV graphic.

[0120]

The delete button 265 deletes the graphic corresponding to the selected key code from internal memory. An alert is displayed before the file is deleted so that the user can confirm the deletion. The close button 266 closes the NV management dialog box 260 and returns to the logo production screen 210.

[0121]

(Logo registration file production process)

The logo registration file production process is described in further detail below using flow charts. Fig. 20 is a flow chart of the process for producing the logo registration file 5 after the logo data is produced.

[0122]

Logo data (logo) is produced by the data adjustment processing means 13 (Fig. 1, Fig. 4, Fig. 5) according to the various input settings (S310). Whether logo data production is completed is confirmed (S320), and if it is not completed (S320 returns no) operation waits until production is completed (S310, S320). When logo data production ends (S320 returns yes), a command data set is generated (S330), and the logo data and command set are combined to produce the logo registration file 5 (Fig. 2) (S340). The resulting logo registration file 5 is then sent to the target printer host device via floppy disk or communication line (S350).

[0123]

Fig. 21 is a flow chart showing the command data set production step (S330) shown in Fig. 20 in detail.

[0124]

After logo data production is completed (Fig. 20, S320 returns yes), a registration command data set run by the printer for registering the logo data in the printer is generated (S331). The registration command data set is a set of commands run by the target printer to store the logo data in non-volatile memory inside the printer.

[0125]

After the registration command data set is completed (S331), whether a data transmission command set is to be added to the executable command set is determined (S332). The system can be configured so that adding the data transmission command set is optional according to the logo data registration file type.

[0126]

If the transmission command is not added (S332 returns no), the procedure advances to step S340 to generate the logo registration file. If the transmission command is to be added (S332 returns yes), the transmission command data set is generated (S333). The transmission command data set is a set of commands for sending the logo data and registration command data set from the host to the target printer. This enables sending the registration command set and logo data from the host to the target printer automatically

by simply reading the logo registration file or by specifying the communication port number and other parameters.

[0127]

Whether to include a port detection command set in the transmission command set is then confirmed (S334). If it is necessary to include the port detection command set (S334 returns yes), the port detection command set is generated. If the port detection command set is not necessary (S334 returns no), the parameter input command set is generated (S336).

[0128]

Fig. 22 is a flow chart of the step S340 shown in Fig. 20 for generating the logo registration file.

[0129]

After the command data set is created (S330, Fig. 20), the logo registration file production step is activated (S340 in Fig. 22). In the logo registration file production routine an executable command data set 41 consisting of a command set and data adding the registration command data set produced in the command data set production step (S331, Fig. 21) to the logo data (print image data) is generated (S341). Combining these two elements is indicated to the left of step S341 in Fig. 22. The printer can register the logo data by sending the data combining this registration command set and logo data from the host to the printer.

Whether the transmission command data set was generated in the command data set production routine (S330) is confirmed next (S342). If it was not (S342 returns no), the executable command data file 41 from step S341 is output as the logo registration file 5. If the transmission command data set was generated (S342 returns yes), presence of the port detection command set is confirmed (S343). If the port detection command set was also generated (S343 returns yes), the port detection command set is combined with the transmission command data set (S344). If the port detection command set was not produced (S343 returns no), the parameter input command set is combined (S346).

[0130]

A combined command data set 42 (shown on the left side in Fig. 22) combining the transmission command data set with the executable command data set 41 generated in step S341 is then produced (S345).

[0131]

If the port detection command set is included in the transmission command data set in the combined command data set 42

and the host reads the logo registration file, the port detection command is run, the communication port to which the printer is connected is automatically detected, and the registration command data set and logo data are automatically sent from the host to the printer.

[0132]

If the parameter input command set is included in the transmission command data set of the combined command data set 42 (Fig. 22), the parameter input command set is run when the host reads the logo registration file and the communication port and other communication parameters can be input from the host. When the parameters are input, the registration command data set and logo data are transferred to the specified communication port and sent to the printer.

[0133]

As will be known from the above description, the logo editing tool 2 and logo data producing apparatus 4 of the present invention make it possible to create diverse logos for a variety of printing purposes, make it simple to register and change logos, and enable color logo printing to be effectively applied for a specific printing objective.

[0134]

The above description has been limited to a printer, but the invention shall not be limited to printers and the invention can also be used for registering logos in a display apparatus having limited displayable colors.

[0135]

The invention has also been described as a way to speed logo printing by storing a logo to the logo registration unit 61 (Fig. 2) of a printer 60. However, the basic concept of color logo color reduction and color assignment according to the present invention can also be applied to other applications printing a color bitmap on a printer capable of printing only limited colors (such as only 2 colors), including printer drivers for the Windows (R) operating system or a device control system such as provided by OLE for Retail POS (referred to as "OPOS" below). More specifically, applications such as these conventionally require using a separate bitmap conversion tool to convert a full-color image to a 2-color image for printing. Using the present invention, however, these files can be printed without this file conversion step.

[0136]

This is described with reference to Fig. 23 and Fig. 24. Fig. 23 shows the basic OPOS configuration. Device 74 can be a printer or customer display, and is described below as a printer.

[0137]

OPOS provides a device-independent interface for printers and other peripherals for POS application programs running under Windows based on standardized specifications. For the POS application 70 to output from printer 74, data is passed to the printer control object (CO) 71, then to the service object (SO) 72 corresponding to the model of the output printer, and then to the printer 74 through the operating system (OS) (Windows) 73. If the printer 74 is a two or three color printer, images with more colors must be reduced to the printable colors for printing.

[0138]

Because it is primarily the service object 72 that runs a specific process for each particular device 74 with the device control system provided by OPOS, the color reduction process settings and color assignment function of the present invention can be provided in the service object 72 for conversion to printable image data before sending the data through the OS 73 to the printer 74.

[0139]

In other words, if full-color print data is sent from the POS application 70 to the device control system provided by OPOS, full-color print data is converted in the service object 72 to two-color data for the POS printer, and then sent via the OS 73 to the printer 74. At this time a process (image processing, brightness, color, other) for converting full-color data to two-color data can be set. By running this conversion process in the service object 72, a process for converting full-color data to two-color data does not need to be run on the application program side, and application development is easier. A set-up screen 400 is shown in Fig. 24. The service object 72 is written to include an image adjustment service routine including, for example, color reduction from a full color image, and a screen such as shown in Fig. 24 can be displayed. If color bitmap 401 is selected, for example, a halftone control box 402 such as described with inputting properties in Fig. 15 is presented so that the color reduction method and brightness can be set. The printable first and second colors can also be specified using the color selection box 403. These functions are the same as

described above with reference to the image properties screens, and further description is therefore omitted here.

[0140]

A particular image file can be automatically converted to two colors and printed by previously inputting these settings. The settings can also be changed as desired according to the specific image. A configuration enabling setting intermediate colors such as shown in Fig. 17 is also possible.

[0141]

[Effects of the invention]

It is therefore possible to specifically determine what parts of the source image to assign to what colors, and what color reduction method to use for color reduction while viewing the actual colors of the source data.

The image processed source data is displayed on screen by the logo data image display means 15 (Fig. 1) as an image after the changes. It is therefore possible to confirm from the image what kind of print image will result from the settings. It is also possible to change the input settings while viewing the image after being processed.

[0142]

The image resulting from the source data can therefore be confirmed on screen, and the logo data resulting from the image process after the settings are defined can be confirmed. It is therefore easy to determine what settings to use before input, the results on the image can be visually confirmed after the settings are made, and the conversion and other processes can be quickly and easily completed.

[0143]

An image reduction processing means 17 (Fig. 4) is provided and the source data and logo data are displayed after the reduction process. As a result, the source data and image of the logo after conversion can be displayed on the same screen, and even more efficient image adjustment is possible.

[0144]

It is therefore possible by means of the present invention to easily produce diverse logos for particular printing purposes, and logo registration and changing are made easier. As a result, the capabilities of color logo printing can be effectively utilized.

[0145]

The start and end printing positions in the direction of travel of a print head having arrays of elements for printing different colors can be determined with a simple method by means of the present invention, and print head movement can therefore be efficiently controlled.

[Brief description of the drawings]

Fig. 1 is a function block diagram of a logo data producing apparatus according to a preferred embodiment of the present invention.

Fig. 2 is a concept diagram describing an outline of the process for logo registration using a logo editing tool and logo data producing apparatus.

Fig. 3 is a function block diagram of a logo editing tool according to a preferred embodiment of the present invention.

Fig. 4 is a function block diagram of a logo data producing apparatus according to a second embodiment of the present invention.

Fig. 5 is a function block diagram of a logo data producing apparatus according to a third embodiment of the present invention.

Fig. 6 is a function block diagram of a logo registration file output means 18 according to a preferred embodiment of a logo data output means 16 able to produce a logo registration file.

Fig. 7 is a flow chart of a preferred embodiment of a logo editing method for producing the source data.

Fig. 8 shows an example of a size input dialog box displayed to specify the size of the logo (source data) when creating new source data using the logo editing tool.

Fig. 9 shows an example of a text property input screen displayed to set text properties when editing the source data.

Fig. 10 shows an example of an image property input screen displayed to set image properties when producing or editing the source data using the logo editing tool.

Fig. 11 shows an example of a position input screen displayed to specify the position of a logo using the logo editing tool.

Fig. 12 is a flow chart showing a logo data producing method according to a preferred embodiment of the present invention.

Fig. 13 shows an example of a logo production screen used to set the parameters for reading source data and producing logo data.

Fig. 14 shows an example of a property input box displayed by the logo data producing apparatus to input text data with a properties input box.

Fig. 15 is a drawing of a screen for describing an example of a setup screen enabling various color assignments, (a) showing an example of a screen whereby after reducing the source data to eight colors the eight colors can be assigned to 15 colors, and (b) showing an example of a setup screen whereby source data reduced to eight colors can be assigned to three colors.

Fig. 16 shows the relationship between the color assignment slider 251 shown in Fig. 15 and the 15 colors that can be expressed using four dots per pixel in a printer that can print two colors (three colors in including the non-printing color) per dot.

Fig. 17 is a drawing showing an example of a setup screen enabling various color assignments, (a) showing an example of a setup screen whereby after reducing the source data to eight colors the eight colors can be assigned to 15 colors, and (b) showing an example of a setup screen whereby source data reduced to eight colors can be assigned to three colors.

Fig. 18 shows the relationship between 15 different colors and the color assignment slider 251 in Fig. 15.

Fig. 19 shows an example of the selection dialog used for non-volatile printer memory management.

Fig. 20 is a flow chart of the process for generating the logo registration file after producing the logo data.

Fig. 21 is a flow chart showing the command data set generating step (S330) in Fig. 20.

Fig. 22 is a flow chart showing the logo registration file generating step (S340) in Fig. 20.

Fig. 23 shows the basic configuration of OLE for Retail POS (OPOS).

Fig. 24 shows an example of a setup screen for image adjustment in OPOS.

[Key to the figures]

2 logo editing tool
3 source data
4 logo data producing apparatus
5 logo registration file
10 source data capturing means
11 source data display means
12 parameter data input means
13 data adjustment processing means
14 main control means
15 logo data display means

16 logo data output means
17 image reduction means
41 executable command data set
42 combined command data set

[Document title] Abstract

[Abstract]

[Problem] To provide a logo data producing apparatus and method able to specify colors and adjust images according to the printing purpose.

[Means of solving the problem] Configured so that source data consisting of image data of two or more colors can be obtained, and desired colors that can be printed by a printer can be freely set as the colors of the logo data while observing an image of the captured source data. After color assignments are input, the source data is processed according to the input settings and output. A configuration whereby an image of the data after processing based on the color assignment settings is also displayed, and the color assignments are set while viewing the image, is also possible.

[Selected figure] Fig. 1

TEXT IN THE FIGURES

FIG. 1

SOURCE DATA CAPTURING MEANS 10

SOURCE DATA IMAGE DISPLAY MEANS 11

INPUT --> PARAMETER DATA INPUT MEANS 12

DATA ADJUSTMENT PROCESSING MEANS 13

MAIN CONTROL MEANS 14

LOGO DATA IMAGE DISPLAY MEANS 15

LOGO DATA OUTPUT MEANS 16

FIG. 2

PICTURE, PHOTOGRAPH, OR OTHER IMAGE 80

LOGO EDITING TOOL 2

SOURCE DATA 3

LOGO DATA PRODUCING APPARATUS 4

PRINTER 60

GENERAL PURPOSE IMAGING EDITING TOOL 81

IMAGE DATA 82 (BMP, GIF, OTHER)

BITMAP FILE 83

LOGO REGISTRATION FILE 5

POS TERMINAL HOST SYSTEM 50

FIG. 3

IMAGE DATA READING MEANS 31

STORAGE MEANS 32

IMAGE DATA PROCESSING MEANS 33
EDITOR INPUT --> TEXT DATA EDITING MEANS 34
DRAWING INPUT --> GRAPHIC DRAWING MEANS 35
SYNTHESIZING MEANS 36
SOURCE DATA OUTPUT MEANS 37

FIG. 4
SOURCE DATA CAPTURING MEANS 10
SOURCE DATA IMAGE DISPLAY MEANS 11
INPUT --> PARAMETER DATA INPUT MEANS 12
DATA ADJUSTMENT PROCESSING MEANS 13
MAIN CONTROL MEANS 14
LOGO DATA IMAGE DISPLAY MEANS 15
LOGO DATA OUTPUT MEANS 16
IMAGE REDUCTION PROCESSING MEANS 17

FIG. 5
SOURCE DATA CAPTURING MEANS 10
SOURCE DATA IMAGE DISPLAY MEANS 11
PARAMETER DATA INPUT MEANS 12
DATA ADJUSTMENT PROCESSING MEANS 13
MAIN CONTROL MEANS 14
LOGO DATA IMAGE DISPLAY MEANS 15
LOGO DATA OUTPUT MEANS 16
IMAGE REDUCTION PROCESSING MEANS 17

FIG. 6
DATA ADJUSTMENT PROCESSING MEANS 13
REGISTRATION COMMAND SET GENERATING MEANS 22
PARAMETER INPUT COMMAND SET GENERATING MEANS 24
PORT DETECTION COMMAND SET GENERATING MEANS 25
TRANSMISSION COMMAND SET GENERATING MEANS 26
LOGO REGISTRATION FILE GENERATING MEANS 20
INTERFACE 21
--> TO STORAGE OR RECORDER
--> TO DATA COMMUNICATION LINE

FIG. 7
LOGO EDITING PROCESS
S101 READ IMAGE DATA?
S102 READ AND STORE

S103 DRAWING IS TEXT INPUT?
S104 DRAWING, TEXT DATA INPUT PROCESS
S105 CHANGE SIZE AND MERGE IMAGE AND TEXT OBJECTS
S106 END INPUT?
S107 OUTPUT SOURCE DATA
END

FIG. 8

SOURCE FILE REFERENCE
PRINTER DATA
    NAME
    PAPER WIDTH
    COLOR 1
    COLOR 2
    RESOLUTION
        VERTICAL
        HORIZONTAL
COMMUNICATIONS
    PORT
    BAUD RATE
    BIT LENGTH
    PARITY
    FLOW CONTROL
PROPERTIES
NEW PREVIEW SAVE TO FILE MEMORY MANAGEMENT
EDIT TEST PRINT SAVE TO PRINTER QUIT

FIG. 9

FILE EDIT DISPLAY TOOLS
READY

FIG. 10

COORDINATE INPUT
PLEASE INPUT THE LOGO SIZE.
    WIDTH (W): 512 DOTS
    HEIGHT (H): 341 DOTS
    OK CANCEL

FIG. 11

TEXT PROPERTIES
FONT STYLE SIZE OK/CANCEL

MS MINCHO STANDARD
MS MINCHO ITALIC
BOLD
BOLD ITALIC SET TEXT COLOR
ATTRIBUTES SAMPLE
OVERSTRIKE
UNDERLINE
ROTATE 0 DEGREES
SAMPLE
AAAAAAA JI

FIG. 12
IMAGE PROPERTIES OK/CANCEL
FILE NAME
PREVIEW DRAWING MODE
BRING TO FRONT
MOVE TO BACK
FIT TO PAGE WIDTH

FIG. 13
COORDINATE INPUT OK/CANCEL
START COORDINATES
END COORDINATES

FIG. 14
LOGO DATA PRODUCTION
S201 CAPTURE SOURCE DATA
S202 DISPLAY SOURCE DATA IMAGE
S203 ACCEPT INPUT SETTINGS
S204 DATA PROCESSING BASED ON INPUT SETTINGS
S205 DISPLAY IMAGE AFTER DATA PROCESSING
S206 CONFIRM SETTINGS?
S207 OUTPUT LOGO DATA
END

FIG. 15
SOURCE FILE REFERENCE
PRINTER DATA
NAME
PAPER WIDTH
COLOR 1 BLACK

```
     COLOR 2    RED
     RESOLUTION
          VERTICAL
          HORIZONTAL
COMMUNICATIONS
     PORT
     BAUD RATE
     BIT LENGTH
     PARITY
     FLOW CONTROL
PROPERTIES
     OBJECT     IMAGE 1
     HALFTONE
          COLOR REDUCTION
               COARSE     FINE
          BRIGHTNESS
               BRIGHT     DARK
          GRAY SCALE
               COLOR           BLACK
NEW  ACTUAL SIZE     SAVE TO FILE       MEMORY MANAGEMENT
EDIT TEST PRINT      SAVE TO PRINTER    QUIT
```

FIG. 16

```
PROPERTIES
     OBJECT     TEXT 2
     TEXT       ABC TRADING
     COLOR           BLACK
```

FIG. 17

(A)

```
ASSIGN 15 COLORS TO 8 COLOR DATA
PRINT COLOR
     COLOR 1         COLOR 2
     BLACK                RED
COLOR ASSIGNMENT
     BLACK
     BLUE
     RED
     MAGENTA
     GREEN
     CYAN
```

YELLOW
WHITE

(B)
ASSIGN 3 COLORS TO 8 COLOR DATA
PRINT COLOR

COLOR 1	COLOR 2
BLACK	RED

COLOR ASSIGNMENT

BLACK	FIRST	SECOND
BLUE	FIRST	SECOND
RED	FIRST	SECOND
MAGENTA	FIRST	SECOND
GREEN	FIRST	SECOND
CYAN	FIRST	SECOND
YELLOW	FIRST	SECOND
WHITE	FIRST	SECOND

FIG. 18
SLIDER 251

FIG. 19
PRINTER MEMORY MANAGEMENT
NV GRAPHIC KEY CODES
LIST KEY CODES 261
SELECT ALL
CLEAR SELECTION
PRINT DELETE CLOSE

FIG. 20
GENERATE LOGO REGISTRATION FILE
S310 LOGO DATA PRODUCTION
S320 PRODUCTION COMPLETED?
S330 GENERATE COMMAND DATA SET
S340 GENERATE LOGO REGISTRATION FILE
S350 OUTPUT LOGO REGISTRATION FILE
END

FIG. 21
S330 GENERATE COMMAND DATA SET
S331 GENERATE REGISTRATION COMMAND DATA SET

S332 ADD TRANSMISSION COMMAND SET?
S333 GENERATE TRANSMISSION COMMAND DATA SET
S334 INCLUDE PORT DETECTION COMMAND SET?
S335 GENERATE PORT DETECTION COMMAND SET
S336 GENERATE PARAMETER INPUT COMMAND SET
TO S340

FIG. 22
S340 GENERATE LOGO REGISTRATION FILE
S341 ADD REGISTRATION COMMAND DATA SET
REGISTRATION COMMAND || LOGO DATA
S342 TRANSMISSION COMMAND SET DETECTED?
S343 PORT DETECTION COMMAND SET DETECTED?
S344 ADD PORT DETECTION COMMAND SET
S345 ADD TRANSMISSION COMMAND DATA SET
TRANSMISSION COMMAND || REGISTRATION COMMAND || LOGO DATA
S346 ADD PARAMETER INPUT COMMAND SET
TO S350

FIG. 23
APPLICATION 70
CONTROL OBJECT (CO) 71
SERVICE OBJECT (SO) 72
OPERATING SYSTEM (WIN) 73
DEVICE (POS PRINTER) 74

FIG. 24
COLOR BITMAP 401
HALFTONE
    COLOR REDUCTION
        DITHER
    BRIGHTNESS
        BRIGHT   DARK
COLOR
    COLOR 1
        BLACK
    COLOR 2
        BLACK
OK CANCEL APPLY